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CHARACTERISTICS OF THE NIIEG * LIVE TULAREMIA VACCINE IN DRY FORM, AS RELATED TO DURATION OF STORAGE

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El'bert first worked out, and tested on humans, procedure for use of the live tularemia egg-yolk vaccine, as produced by the author in liquid form. Of extreme importance for the mass introduction of the vaccine into practice was its preparation in the dry form (according to the method of Faibich and Tamarina), this giving us a dry live tularemia vaccine (the NIIEG * vaccine).

Today the NIIEG vaccine has achieved, thanks to its high stability, a wide application in public immunization practice. Within its expiry term, the vaccine has the following characteristics: it is harmless, its inoculative effectiveness is 100%, it is epidemiologically and immunologically effective, the reaction produced is feeble, and it keeps its powers for a long time.

All these properties of the vaccine, other than its stability, have been made clear in numerous papers (by El'bert, Gaiski, Faibich, Tamarina, Olsuf'yev, Sil'chenko, Yudovich, Maiski and others). The question of stability, however, we have thought it expedient to illustrate in a separate paper, since the period of effectiveness [expiry term] is of great importance in practice.

Olsuf'yev in 1950 pointed out that the dry vaccine is effective for over a year.

Maiski (1953) established that Faibich and Tamarina's preparation, when stored at room temperature (18°C), is effective for a period of 300 days, and if stored at 2-4°C, for 2 years or more. Maiski inoculated 96 persons with NIIEG vaccine which had been kept for a year and a half at room temperature. The observed inoculative effectiveness was 63%.

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* The abbreviation probably means "Research Institute for Epidemiology and Hygiene". (Translator).

According to the Standard Instructions for the carrying out of prophylactic tularemia inoculations as approved by the USSR Ministry of Public Health from the 14th of October 1953, the expiry term of the dry vaccine stored at +4°C is two years from the date of preparation, and for vaccine stored at room temperature (18 - 20°C), about 300 days.

For investigating the periods of effectiveness of the vaccine and the changes in its properties as related to duration of storage, we drew upon two series of dry NIIEG live vaccine: No. 94 put out on March 24, 1951, and No. 97, put out on April 2, 1951. The vaccine was stored in a dry, dark room, at a temperature which varied from minus 2°C in the winter season to plus 18°C in the summer.

Inoculations were performed after periods of one year, two years, three years and four years from manufacture, with all the rules observed as set forth in the above-mentioned Standard Instructions. The age of the subjects vaccinated ranged from ten to fifteen years.

In studying the properties of the vaccine as related to its storage, we treated the skin-reaction to the inoculation as one of the important indices of successful vaccination.

The table lists the results of our personal observations on the inoculative effectiveness and reaction-provoking characteristics of the vaccine stored for periods of one, two, three and four years. The skin-reaction to the inoculation was 91 - 100% for storage-times one and two years in the case of Series No. 94, and 94.7 - 100% in the case of Series No. 97. With longer storage of the vaccine, there commenced a marked decline in the inoculative effectiveness. NIIEG vaccine kept for four years "took" only in isolated cases (7.1 - 9.3%).

The reactions to inoculation, in their character and course, agree with those described by El'bert for egg-yolk tularemia vaccine. It should, however, be remarked that the skin-reactions were stronger and more protracted in the case of vaccines stored for single year then they were with the two-year, three-year and four-year vaccines. The skin reactions to the three-year and four-year vaccines were of an accelerated skin-reaction type.

As may be seen from the table, the reaction-provoking powers of the vaccine decreased with storage. As reactogenic index, we used the development of regional lymphadenitis. Upon inoculation with the one-year-old vaccine, lymphadenitides were observed in a larger percentage of cases than with inoculation of the two-year and three-year vaccines. The intensity of expression and the persistence of the lymphadenitis also decreased with the term of storage.

From the data given above, it is seen that in subjects receiving a primary inoculation with the four-year vaccine the effectiveness was very low. Upon re-vaccination with vaccines stored for four years, a skin-reaction of allergic type was observed in 100% of the subjects undergoing the secondary

inoculation. We made a study of 43 re vaccinated subjects of age ten to thirteen years. They were given a primary vaccination with NIIEG in January 1954, and a re-vaccination on March 20, 1955, with Series No. 94 vaccine (put out in 1951). The re-vaccination was performed by the method of cutaneous scarification. The skin-reaction developed on the second day and developed as one of allergic type. It disappeared by the tenth to fifteenth day. No general reactions were observed upon re-vaccination with the vaccine stored for four years.

Series No.	Time elapsed since manufacture of vaccine (in years)	Number of subjects inoculated	Number with positive result	Percent effectiveness of vaccine	Accompanying Reactions		Lymphadenitis	
					Headache	General debility	Cherry	Pigeon's egg
94	1	114	114	100	23/20.1	20/17.5	16/14	4/3.5
	2	112	102	91.1	16/15.7	13/12.7	9/8.8	2/1.9
	3	53	8	15.1	-	-	-	-
	4	32	3	9.3	-	-	-	-
97	1	120	120	100	24/20	22/18.3	18/15	4/3.3
	2	95	90	94.7	14/15.5	10/11.1	8/8.8	2/2.2
	3	34	7	20.6	-	-	-	-
	4	42	3	7.1	-	-	-	-

Numerator represents absolute figure: denominator percent.